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AN ENVIRONMENTAL SURVEY OF CRYSTAL LAKE

Middletown, Connecticut

September 1993

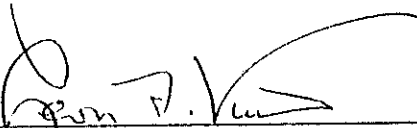
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ACKNOWLEDGMENT

Several persons were responsible for the success and development of both the Crystal Lake area public sewer service and this report. We gratefully acknowledge: Hank Solek, Vincent Mazzotta, James Monopoli, Kate Kupstis, Sharon Solek, Camille Salamone, the Parks and Recreation Department Staff and the Water and Sewer Department Staff for their assistance.



Leon F. Vinci, M.P.H.
Director of Health



City of Middletown

DEPARTMENT OF HEALTH

245 DeKoven Drive, P.O. Box 1300

Middletown, CT 06457-1300

TEL: (203) 344-3474 FAX: (203) 344-0136

Leon F. Vinci, M.P.H.
Director of Health

1993 SURVEY OF CRYSTAL LAKE

INTRODUCTION

Crystal Lake in Middletown, CT is a small, man-made lake which was created in the early 1800's. It has served as a popular recreational attraction for many generations. This water body is owned by the City of Middletown, Connecticut and is approximately two miles in length and covers thirty-five acres of surface area. The city-owned Ron McCutcheon Park is located on the southern tip of the lake. Existing park facilities include: two bathing beaches, a bathhouse, picnic areas, daycamp facilities, a small boat launch, athletic fields, and a playground. The north end of the lake is characterized mostly by buildings and a beach area owned by the Polish Falcons, a local fraternal organization. Other areas include private homes and/or seasonal cottages.

DISCUSSION

Master Plan

In March of 1988, the City of Middletown, Connecticut retained services from an outside contractor to design a master plan for the redevelopment of the Crystal Lake recreational area and McCutcheon Park. The master plan was completed in July of 1988 and included: renovation of existing structures, construction of new bathing facilities, day camp facilities, a concession stand, parking areas, as well as creating new and additional recreational amenities. Horse-shoe pits, baseball fields, basketball courts, bocce courts, and a shuffleboard court were included in the proposal.

Sanitary Survey

In order for this renovation plan to be implemented, public health concerns including environmental and sanitary measures had to be addressed. The Middletown Department of Health had completed a "sanitary survey" several years earlier, which cited problems with on-site sewage disposal systems and water quality concerns. Most homes which encompass Crystal Lake have dug wells and on-site sewage disposal systems.

The sanitary survey noted that most of the neighboring wells and septic systems were experiencing marginal performance at best. The Middletown Department of Health expressed a public health concern for potential water contamination and disease transmission, because lake-front lots are small in size, and separating distances between dug wells and on-site sewage disposal systems are proximate. It is clear that the lake may be receiving some septic run off from nearby homes, since past laboratory reports have indicated excessive coliform counts. A few cases of Giardiasis and Conjunctivitis have been linked to the lake over the recent years. During the survey, control measures to eradicate health hazards were implemented. The sanitary survey stressed a crucial need for a public sewer line extension to the Crystal Lake area. When renovation plans were discussed the Department of Health repeatedly expressed environmental/Public Health concerns because the plans included a new septic system installation for the new bathhouse.

After much discussion and review, the installation of an on-site pumping station and a force main connecting the new facilities to the municipal sewer system were selected. (This plan was "stressed" by the Health Department from the very start). Residents around the lake can also benefit from the sewer line extension by connecting into the system.

The Department of Health initiated an updated survey to determine if there were any failing/inadequate on-site septic systems in the Crystal Lake Road proximity, since this street will be serviced by the sewer line. If a property owner was found to have a failing septic system, they would be required to connect to the new sanitary sewer extension.

METHODOLOGY

Sanitarians initiated a study of the on-site sewage disposal systems servicing all properties. Two parameters of the study included: (1) the property had to have an on-site sewage disposal system and (2) the property had to be situated within 200 feet from the Crystal Lake shoreline.

A total of 45 properties which met the above parameters were included in the survey. The Middletown Department of Health planned to evaluate each individual property by conducting environmentally safe dye tests. The dye is flushed into the dwelling's waste plumbing system. A follow-up inspection is performed within 2-3 days. If the dye test yields a positive result (fluorescent green coloring in the area of the septic system or in the lake itself) then the septic system has a confirmed malfunction.

Sanitarians surveyed each dwelling on a "door to door" basis for each of the forty-five properties. A total of thirty-one properties were dye-tested, with two failures noted. (See Attachment #1) The two (2) dwellings with failing septic systems will be sent formal letters requiring them to hook up to the new city sewer line.

Fourteen dwellings were not tested initially and required follow-up action. They were sent letters requesting their participation in the survey. There were no responses in this group, so visual inspections of each property were performed.

Upon completion of the sanitary survey, the Middletown Department of Health plans to issue an informational notice to area residents (See Attachment #2)

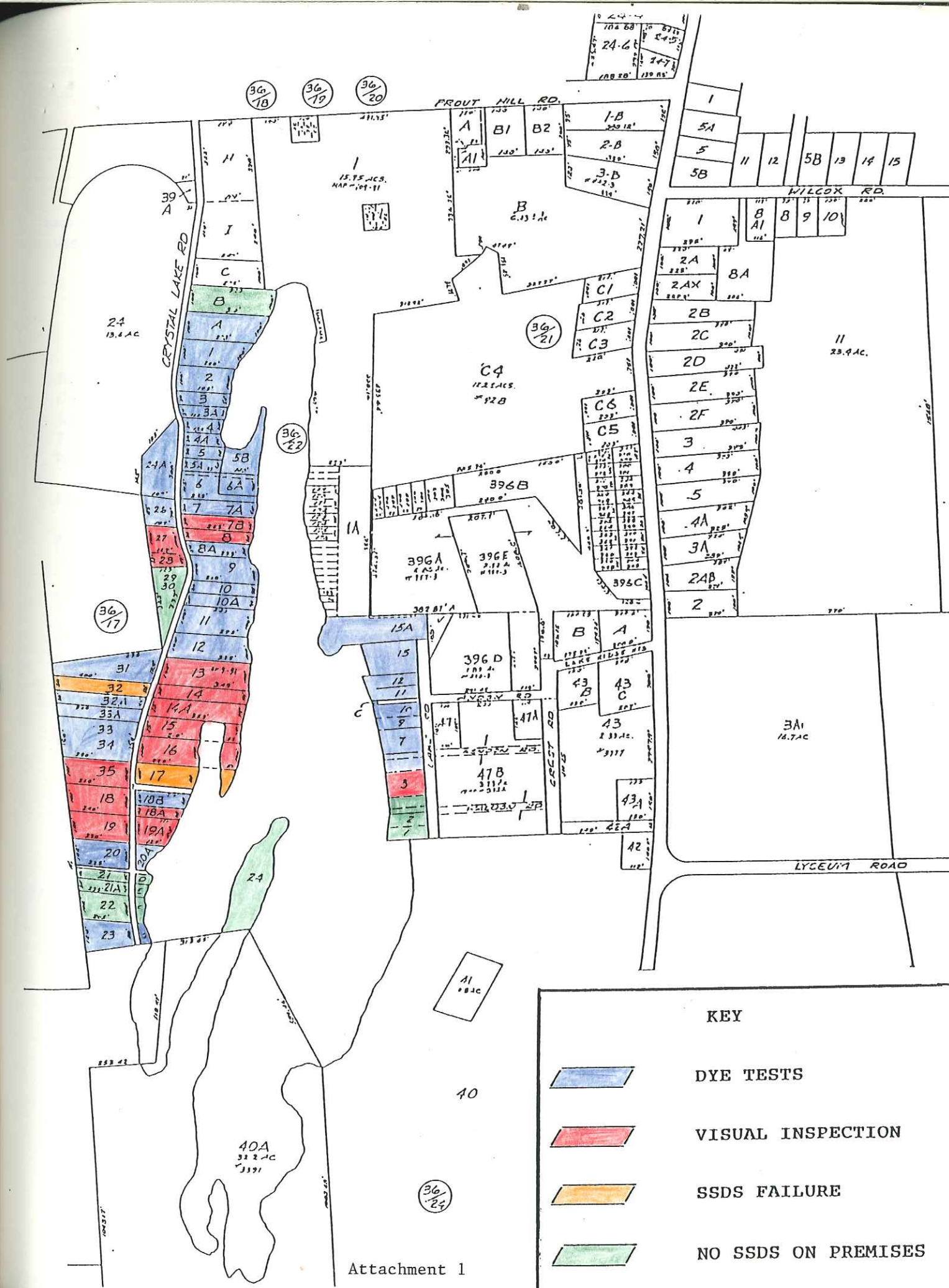
OTHER ACTIVITY

Letters to Crystal Lake homeowners were sent out from the Water and Sewer Department on September 3, 1993. The letter entailed the completion of the new, low pressure sewer system, connection procedures, and charges. (See Attachment #3)

FUTURE ACTION

1. The Health Department recommends extension of the sanitary sewer throughout the perimeter of the lake, to prevent water quality deterioration.
2. The Health Department will perform environmental surveys once every two (2) years in order to monitor the area.
3. Area residents should be educated concerning the proper use and maintenance of their private wells, septic systems, dwellings, and lake areas.

ATTACHMENTS





City of Middletown

DEPARTMENT OF HEALTH

245 DeKoven Drive, P.O. Box 1300

Middletown, CT 06457-1300

TEL: (203) 344-3474 FAX: (203) 344-0136

Leon F. Vinci, M.P.H.
Director of Health

Resident
Crystal Lake Road
Ridge Road
Prout Hill Road
Middletown, CT 06457

Dear Resident:

As you are aware, the installation of the sanitary sewer line in the street has been completed. This is a "low pressure sewer system" and it is now ready to use. You can hook-up to the new public sewer system (in accordance with the procedures of the Middletown Sewer Department) at your convenience.

On a regular basis the Department of Health monitors the water quality from the lake. Since Crystal Lake is a special resource, we urge you to connect to the new sewer as a means to further protect nearby wells and the quality of the lake water.

I am enclosing some related materials for you to read. If you have any questions, or would like any additional information, feel free to call our office at 344-3474.

Yours in water conservation,

Leon F. Vinci, M.P.H.
Director of Health

/cs

Attachment 2



City of Middletown

DEPARTMENT OF HEALTH

245 DeKoven Drive, P.O. Box 1300

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LAKE PROTECTION TIPS

1. Connect to the public sewer system, if feasible.
2. Do not bathe, shampoo, or wash boats, pets, or other objects in the lake with soap or phosphorus-containing detergents. Do not wash automobiles near lakes where the detergent can run into the water.
3. Use low or non-phosphate detergent. Take your clothes to a laundromat located outside the lake's drainage area.
4. Keep land clearing to a minimum - Revegetate bare areas to minimize erosion to the lake. Roads and paths leading to the lake should be curved to reduce erosion.
5. Do not use fertilizer near the lake shore. Encourage shore fronts with natural vegetation, rather than green, manicured lawns.
6. Do not burn brush or leaves near the shore; the nutrients remain behind to be washed into the lake during the first rain. Do not dump leaves or grass clippings in or near the lake. They also add nutrients to the water.
7. Do not feed ducks or other aquatic organisms; there is plenty of natural food available. Nutrients in the feed material, which is produced outside the lake's watershed, will be added to the lake through the organism's feces. Also, by discouraging the duck population, you can reduce the risk of Swimmer's Itch in your area.
8. Do not use powerful outboard motors in shallow areas. The nutrient-laden bottom sediments can be churned into the overlying water to support increased algae growth.

WELL TIPS

1. The Department of Health recommends that homeowners with private wells have a bacteriological test performed on well water once a year, because protective distances between wells and existing septic systems are very minimal. Well water should be analyzed for chemical characteristics once every five (5) years, but sooner if a problem is suspected. Copies of tests results should be forwarded to the Director of Health for our review.

2. Check the area around the well to make sure there is no potential infiltration of surface water. If there is infiltration of surface water, this could indicate that your well casing may be damaged or cracked.
3. Check the well cap and make sure that it is free of buildup and debris.

If there are any questions about any of this information, please call the Department of Health at 344-3478.

Thank you.

KK/lg

Pressure sewer systems an alternative to conventional sewers

About 70 to 80 percent of a centralized conventional wastewater treatment project's pricetag goes to the collection system (sewers). Soil conditions, terrain, and sparse population in rural areas can drive the cost of a conventional gravity collection system to more than \$20,000 per home.

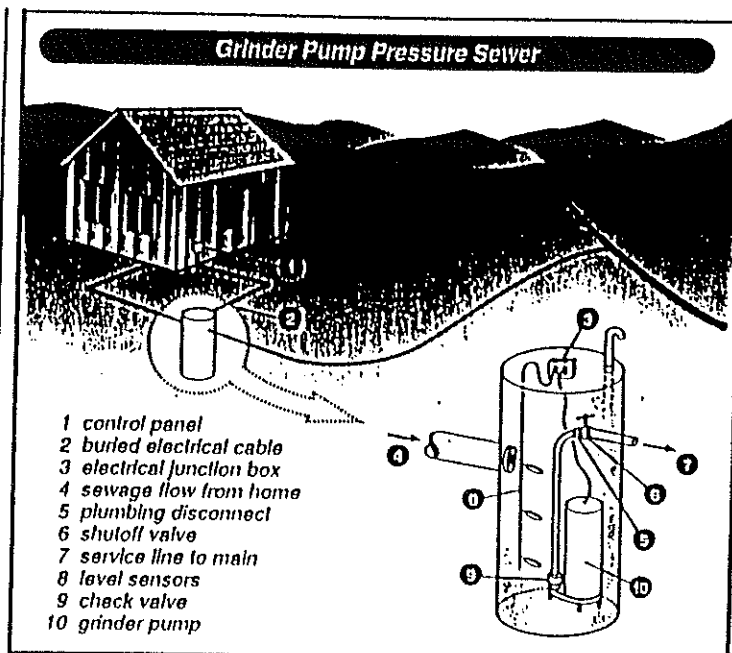
If your community isn't a good candidate for the various onsite wastewater treatment alternatives, yet can't afford a conventional collection system, there are several lower-cost alternatives you can consider.

Pressure sewers, vacuum sewers, and small diameter gravity sewers all generally offer cost savings over a conventional collection system in sparsely populated rural areas, or in areas where rock makes excavation for a conventional system prohibitively expensive.

"I suggest to people that if a conventional sewer is affordable and ecologically sound, that's what you should do," said Bill Downe, a pioneer in pressure sewer systems. "If you are in an area that's difficult to sewer, an alternative sewer system could be the answer."

The cost savings of these alternative systems can be traced to the smaller, lightweight plastic pipe they use. The pipes are not only less expensive than those used in a conventional system, but are also buried at shallow depths, saving on excavation and restoration costs.

According to *Alternative Wastewater Collection Systems*, a 1991 U.S. Environmental Protection Agency (EPA) manual, a community of between 3,500 and 10,000 people is a possible candidate for



all three of the options. Even if your community has fewer than 1,000 residents, some of these alternatives might be suitable, the manual states.

A common alternative collection system is the pressure sewer. In a pressure system, each home has a small pumping unit that propels wastewater through small diameter pipe to a central location.

There are two types of pumping units used in pressure sewers. Grinder pumps (GP) turn raw wastewater into a slurry that travels through the pipes to a central treatment system.

The second type of pump is used in conjunction with a septic tank. Septic tank effluent pump (STEP) systems pump the effluent from a septic tank through the pressure sewer to a central facility where the effluent receives additional treatment.

Because conventional sewers are costly in rural areas, the assessments to owners of undeveloped property often go up sharply. To offset this increase, many owners

develop their property, spurring growth.

Pressure sewers are less expensive and do not drive property assessments up as high. Also, some of the cost of pressure sewers (septic tanks, pumps) does not fall on the owners of undeveloped property, thus lowering the incentive to develop the land.

If your community is interested in pressure sewers, Downe recommends that you start with *Alternative Wastewater Collection Systems* manual, which is available from the National Small Flows Clearinghouse.

He also recommends that you contact consulting engineers, making sure you talk with someone who has had some experience with pressure sewers.

The prices you'll get from contractors will likely vary a great deal, because some contractors have little or no experience with pressure sewers.

"In many cases, the contractors are afraid of the systems, and they'll bid higher on

Pressure sewer systems an alternative to conventional sewers

Continued from page 2

them because they just don't know how it will go," Downe said. "On the other hand, I've seen some contractors who see these projects as an opportunity to create a marketing niche and bid the systems low."

Downe also said that your community should be prepared to do proper maintenance on the system.

"I don't like to say that pressure sewers are more maintenance intensive than conventional sewers, because I've not always found that to be the case," Downe said. "I like to say they are less tolerant of a lack of maintenance than a conventional sewer. If you have a pressure sewer, and a pump goes out, you can't wait a week to fix it."

Downe said that another important factor to consider in a pressure sewer system is public relations.

With a proper public relations campaign, and care in selecting an engineering firm and a contractor, pressure sewers can be money-saving option if your community has found that a conventional gravity collection system is out of reach.

Alternative Wastewater Collection Systems manual is available free from the National Small Flows Clearinghouse. Request product number WWBKDM53. ♦

Pressure sewers the right STEP for Montesano

In 1986, Montesano, Washington had a problem. The city's conventional gravity sewer system, built in the 1940s, had a serious infiltration and inflow (I/I) problem. The city had tried to repair the existing system, but those repairs failed.

The Washington Department of Ecology (WDOE) had issued administrative orders for the city to clean up its wastewater discharge and to come up with a sewer

grant from the U.S. Environmental Protection Agency. The STEP system uses a lagoon system for secondary treatment.

Mike Ollivant, P.E., of Parametrix, Inc., the engineering firm for the project, said there was some hesitancy in the community about the STEP system.

"It's understandable that a community would be hesitant of an alternative technology," Ollivant said. "It was relatively new."

To deal with the issue, Montesano put together a large public education campaign to help explain the STEP system.

"Anytime you have to construct

We only had four property owners out of 1,278 initially refuse to sign the easements for construction on their property, and those four eventually signed without any legal action.

Montesano owns the septic tanks, pumps and connections on the residents' property and performs regular inspections and maintenance.

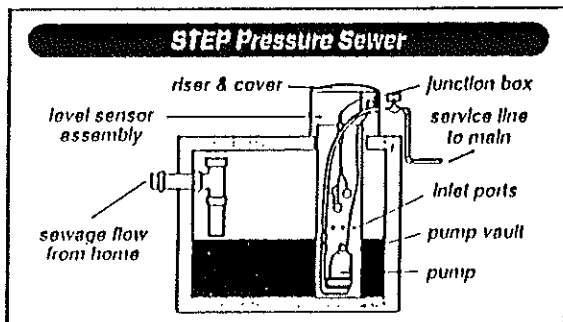
"This is a system where maintenance has to be proactive," Ollivant said. "That is a requirement. If you aren't prepared to do that, the community will be unhappy."

In 1992, Montesano's collection system required 350 hours of inspections and maintenance. This year, the community has already spent more than 400 hours on inspections and maintenance. The increase is primarily because this is the third year of operation, and septic tank inspections must be completed every three years, as a requirement of the city's NPDES permit, Ollivant said.

Ollivant said that a community considering a STEP system probably wouldn't encounter as much public hesitancy.

"As we become more and more involved in STEP systems, we find we don't have near the hesitancy, if any at all in communities, because STEP systems are being more widely utilized," Ollivant said.

If you'd like to talk to Ollivant about STEP systems, you can call him at (206) 863-5128. ♦



replacement plan to correct excessive infiltration/inflow.

When the city began looking at alternatives for a sewer replacement plan, they contacted Parametrix of Sumner, Washington. They considered two options: installing a new conventional gravity system, or installing a septic tank effluent pump (STEP) pressure sewer.

Montesano, population 3,200, finally decided on a STEP system with a pricing of about \$13 million. The city received about half of the amount in the form of a

grant from the U.S. Environmental Protection Agency. The STEP system uses a lagoon system for secondary treatment.

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City of Middletown

WATER AND SEWER DEPARTMENT

Richard P. Dimmock, P.E.

Chief Engineer

245 DeKoven Drive, P. O. Box 1300

Middletown, CT 06457-1300

Tel: (203) 344-3447 Fax: (203) 344-0136

September 3, 1993

Field 2~

Field 3~

Re: Crystal Lake Low Pressure Sewer
Crystal Lake Road, Ridge Road &
Prout Hill Road
Middletown, CT 06457

Dear field 4~

As you are probably aware, the City has just finished the construction of a Low Pressure Sewer System (LPSS) in the street in front of your property. The rules and regulations regulating the use of sanitary sewers, specify that "Whenever possible, the building sewer shall be a gravity sewer. When not, then sewage shall be transferred by a means approved by the Sewer Authority"(WPCA).

Each house that is connected to the system will have an individual pump and grinder system that is installed either in the basement or outside of the basement in a tank. A small force main (pressure line) is connected from that tank to the recently installed sewer in the street. The details and the specifics of each system requires the design expertise of a licensed Civil Engineer. The following procedure should be followed.

- A. Connection Charges - Applicable charges for the property to be served must be paid to the City prior to initiation of other procedures.

UNIT CHARGE-----\$ 1,500.00

LOT CHARGE-----\$ 750.00

LATERAL CHARGE * -----\$ 600.00

TOTAL IF PAID IN FULL \$ 2,850.00

OPTIONAL 10 YEAR PLAN

First Payment (when you apply) \$ 285.00

Remaining 9 payments each \$ 285.00 plus

8% interest on unpaid balance.

* If a lateral is not available, this charge is not included and you pay for new lateral construction.

- B. Design - A Professional Engineer shall design and submit A Site Plan Review application including all items required by that application. He shall also design and

illustrate that the following are included in the construction.

1. Requires the installation of semi-positive-displacement low pressure grinder pumping units.
 2. Requires the installation of a permanently mounted motor-generator to operate each low pressure pumping unit, in the case of a power failure. Each motor-generator to be furnished with complete operating instructions. Also, each motor-generator to be furnished with an installed manual starting mechanism in case of power failure.
- C. Connection Permits - Applicable excavation and connection permits must be obtained 24 hours prior to start of any Construction work.
1. Excavation permits are issued by State D.O.T. or City of Middletown Department of Public Works as applicable.
 2. Connection Permits are issued by the Sewer Department only to drain layers licensed by the State of Connecticut.
 3. Plumbing Permits for the installation of all work within the house to 5 feet beyond the house are issued by the City Building Department.
- D. Construction Inspections - All construction shall be inspected by the appropriate City and/or State Agency. For the exterior construction (5 feet beyond the building), the Water and Sewer Department (W.S.D.) shall provide inspection prior to any backfill.
1. The drain layer shall be responsible to provide the inspector adequate notice of inspection readiness.
 2. Mandatory re-excavation shall be required on all uninspected or unapproved installations.

If you desire to or are required to make a connection to the above sewer facility to replace your septic system, you may proceed with your planning at this time. Reference to the Phone book under Civil Engineers will give you a list of the available design professionals.

Sincerely,

Richard P. Dimmock, P.E.
Chief Engineer